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Economic Growth, Human Capital, Public Investment, and Poverty in Underdeveloped Regions in Indonesia

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Abstract: Poverty is a worldwide issue since its effects are widespread. In Indonesia, most pockets of poverty are found in rural or underdeveloped areas. This research is essential as a reference for addressing the issue of poverty in Indonesia's undeveloped regions, as few studies have analyzed the causes of poverty in underdeveloped regions. This study analyses the impact of economic growth, human capital, and public investment on the alleviation of poverty in Indonesia's undeveloped regions. This study employs panel data from 62 underprivileged regions in Indonesia according to Presidential Decree No. 63 of 2020 with an observation period of 2010-2020. The analytical method used is the ECM panel model. The unit root test indicates that the research data is steady and cointegrated at the first level of differentiation. This study demonstrates that economic growth does not have a substantial influence on poverty levels in underdeveloped areas of Indonesia, although human capital and public investment do, both in the short and long term. Human capital contributes more to reducing poverty in disadvantaged areas, but state investment increases the number of poor in Indonesia's underdeveloped regions.
Keywords: Economic Growth; Human Capital; Public Investment; Poverty; Underdeveloped Region
JEL Classification: I32; R11; E24; R53

Introduction

Poverty is a worldwide phenomenon that occurs in nearly all nations (Xiao et al., 2022) because the problem of poverty exists in practically every nation in the world. Poverty issues color the development process in a country (Todaro, 2011). So that the problem of poverty becomes a social problem because those who are classified as poor are not able to carry out responsibilities like people who are not poor, are unable to carry out social functions, are unable to take quality education, do not have a decent standard of living, have limited access to health services, and access to health services or other basic services (Maipita, 2014). Various limitations faced by the poor can trigger various social problems, such as crime, theft, disobedience to rules, and various other social problems (Lymperopoulou & Bannister, 2022).

Since the poor are synonymous with low productivity, low education, bad health, and other constraints, their income and purchasing power are generally low (Todaro, 2011). Consequently, the contribution of the poor to national output is comparatively diminished (Thorbecke & Ouyang, 2022; Xiao et al., 2022).

There are numerous causes of the dynamics of poverty. Low economic growth resulting from population expansion is one of the factors that raise poverty (Todaro, 2011). It is because low economic development resulting from population growth affects per capita income, and the number of individuals living below the poverty increases (Maipita, 2014; Permadi, 2018; Todaro, 2011). Multiple empirical studies have demonstrated that rapid economic growth can reduce poverty in the Nile River basin (Lin et al., 2022) and in emerging nations, particularly in Sub-Saharan Africa (Thorbecke & Ouyang, 2022).

According to Kuznets, growth and poverty have a strong correlation because the poverty rate tends to rise in the early phases of development (Sarigiannidou & Palivos, 2012) and then steadily decreases in the later stages. The hypothesis has been demonstrated and provided evidence that economic growth at a certain level can reduce poverty levels (Handalani, 2019; Permadi, 2018; Septiadi, 2019; Wardhana & Kharisma, 2019).

In addition to economic growth, the quality of human resources (human capital) is a determinant of poverty (Handalani, 2019). In underdeveloped areas, the high poverty rate is frequently the result of a low-quality labor supply (Geng & Guo, 2021). Therefore, by increasing the ability of the poor through education and health care, it will increase their productivity and help them escape poverty (Olopade et al., 2019). The results of empirical studies indicate that building human capital through enhancing education and health can reduce poverty levels (Masduki et al., 2022; Olopade et al., 2019).

Public investment expenditures are another factor that can affect poverty levels. The public investment made by the government or local government is one of the driving forces behind economic growth (Mustaqimah et al., 2017). Public investment can improve infrastructure, especially agricultural infrastructure in rural regions, which will stimulate farmers' productivity and facilitate farmers' access to markets for the sale of agricultural products, hence increasing farmers' revenue (Etuk & Ayuk, 2021). The increase in farmers' income can finally release them from the screams of poverty (Nanhthavong et al., 2020).

Government spending also reflects the costs incurred by the government to implement its policies, particularly in the provision of public services, such as in the fields of education and health care (Misdawita & Sari, 2013). The results of empirical studies show that government funding in the education and health sectors reduces poverty dramatically (Mustaqimah et al., 2017; Prasetyia et al., 2011). While other studies conclude that government spending on education has a negative influence on poverty, after incorporating the variables of economic growth, literacy rate, and unemployment, the value becomes positive or can increase poverty (Wardhana & Kharisma, 2019). Another study in the education sector using per capita income as a mediator demonstrates that education has a negative and significant impact on poverty (Purnomo

et al., 2020).

As seen in Figure 1, poverty statistics in Indonesia are highly fluid. Despite a decline over the past decade, the number of poor people in Indonesia remains very high. In 2011, the population living below the poverty line was 12.49 percent (30.02 million people); however, in 2019, that number dropped to 9.41 percent (25.14 million people). In 2020, it increased to 9.78 percent (26.42 million people) as a result of the worldwide pandemic of COVID-19.

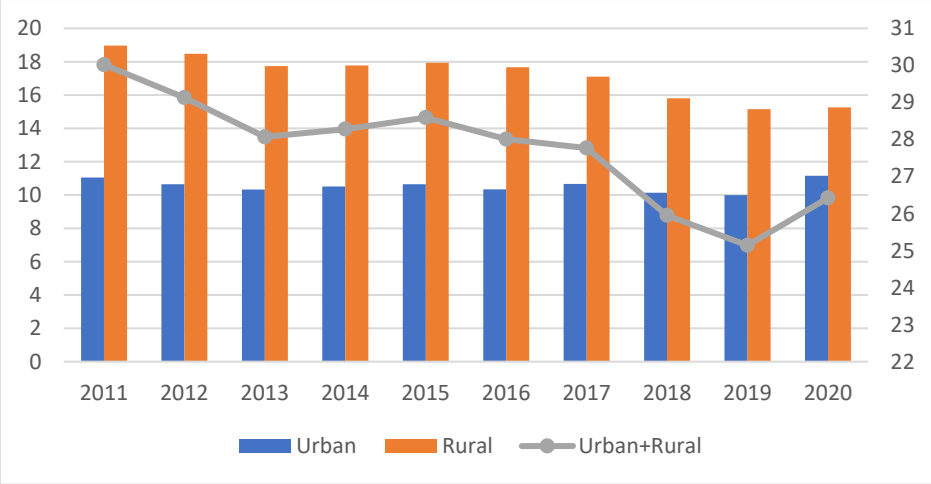

Figure 1 Poverty Trend by Region in Indonesia
Source: Indonesian Central Bureau of Statistics

According to data on poverty, rural areas have the highest number of destitute people. This illustrates that the pockets of poverty in Indonesia are concentrated in rural areas where agriculture is the dominant economic sector. Therefore, the problem of poverty in rural areas, which generally predominates in underdeveloped areas, becomes interesting to research since it has its own characteristics of poverty.

The research findings that examine the problem of poverty in Indonesia are devoted to analyzing the factors that determine poverty in Indonesia. Previous researchers used provincial data in their study (Ningsih & Andiny, 2018; Yasa & Arka, 2015; Prasetyia et al., 2011; Soleh, 2015; Wardhana & Kharisma, 2019) or district/city (Hermawati, 2013; Nopriansyah et al., 2015; Suadnyani & Darsana, 2018) as the unit of analysis. Research that examines on the drivers of poverty in underdeveloped regions of Indonesia has been carried out (Masduki et al., 2022), where government spending is used as the independent variable. However, this study only focuses on disadvantaged areas on the island of Java as the research subject. Meanwhile, the Presidential Decree Number 63 of 2020 stipulates that underdeveloped regions in Indonesia are dominated by regions outside Java, as presented in Table 1. Thus, analyzing the determinants of poverty in underdeveloped regions as stipulated in the Presidential Decree is a novelty in this research.

Table 1 The List of Underdevelopment Regencies in Indonesia

Province	Disadvantaged District	Total
Sumatera Utara	(1) Nias, (2) Nias Selatan, (3) Nias Utara, (4) Nias Barat	4
Sumatera Barat	(5) Kepulauan Mentawai	1
Sumatera Selatan	(6) Musi Rawas Utara	1
Lampung	(7) Pesisir Barat	1
Nusa Tenggara Barat	(8) Lombok Utara	1
Nusa Tenggara Timur	(9) Sumba Barat, (10) Sumba Timur, (11) Kupang, (12) Timor Tengah Selatan, (13) Belu, (14) Alor, (15) Lembata, (16) Rote Ndao, (17) Sumba Tengah, (18) Sumba Barat Daya, (19) Manggarai Timur, (20) Sabu Raijua, (21) Malaka	13
Sulawesi Tengah	(22) Donggala, (23) Tojo Una-una, (24) Sigi	3
Maluku	(25) Maluku Tenggara Barat, (26) Kepulauan Aru, (27) Seram Bagian Barat, (28) Seram Bagian Timur, (29) Maluku Barat Daya, (30) Buru Selatan	6
Maluku Utara	(31) Kepulauan Sula, (32) Pulau Taliabu	2
Papua Barat	(33) Teluk Wondama, (34) Teluk Bintuni, (35) Sorong Selatan, (36) Sorong, (37) Tambrauw, (38) Maybrat, (39) Manokwari Selatan, (40) Pegunungan Arfak	8
Papua	(41) Jayawijaya, (42) Nabire, (43) Paniai, (44) Puncak jaya, (45) Boven Digoel, (46) Mappi, (47) Asmat, (48) Yahukimo, (49) Pegunungan Bintang, (50) Tolikara, (51) Keerom, (52) Waropen, (53) Supiori, (54) Mamberamo Raya, (56) Lanny Jaya, (57) Mamberamo Tengah, (58) Yalimo, (59) Puncak, (60), Dogiyai, (61) Intan Jaya, (62) Deiyai	22

Sources: Presidential Decree No. 63, 2020

Thus, the analysis of the factors affecting poverty in Indonesia's undeveloped regions, as regulated in Presidential Decree Number 63 of 2020, becomes intriguing when it is considered that problems in underdeveloped regions have their own characteristics. Therefore, this study will examine the effect of economic growth, human capital, and public investment on poverty in Indonesia's undeveloped regions. The findings of this study are expected to be a reference for policymakers attempting to alleviate poverty in Indonesia's undeveloped regions.

Through this study, information on the effects of economic growth, human capital, and public investment will be beneficial in formulating poverty alleviation policy strategies in Indonesia's undeveloped regions. As required by a presidential decree, stimulating economic growth, boosting human capital, and expanding public investment, which in the end, can have an impact on reducing poor areas in Indonesia.

Research Method

This study utilizes secondary panel data consisting of 62 districts classed as undeveloped pursuant to Presidential Decree No. 63 of 2020 for the period 2011 to 2020. The selection of this time frame is intended to illustrate the persistent nature of poverty in

disadvantaged areas in the long term. The data for this study comes from the Indonesian Central Statistics Agency (BPS) and other pertinent institutions.

Based on the literature review, it revealed that economic growth, human capital, and public investment contribute to poverty reduction. Thus, the independent variables used in this study are economic growth as measured by GRDP per capita, human capital as assessed by the average number of years spent in school, and public investment as measured by direct spending. Comparatively, the dependent variable is the number of poor people in the area under this study.

This research employs a dynamic panel regression model with an error correction model (ECM) approach to explain the short- and long-term dynamics of poverty in underdeveloped regions. The ECM approach is based on the findings of the stationary research data stationarity test at the same level of differentiation utilizing the Augmented Dickey-Fuller (ADF), Philips Perron, and Levin, Lin & Chu (LLC) methods, as well as the cointegration relationship between model variables. Because a non-stationary time series data regression model is more likely to produce erroneous regression results (Granger & Newbold, 1974). This is based on the hypothesis that each individual time series data contains a unit root (Levin et al., 2002). Therefore, the cointegration test is used to determine the long-term relationship between variables in the model.

Based on the theoretical framework that underlies this research, this research is modeled using the panel data regression model as follows:

$$\log PV_{it} = \alpha_0 + \alpha_1 \log GR_{it} + \alpha_2 \log HC_{it} + \alpha_3 \log PI_{it} + \varepsilon_{it} \quad (1)$$

Where PV_{it} is the poverty level, GR_{it} is economic growth, HC_{it} is human capital, and PI_{it} is public investment. While α_0, α_1, α_2, and α_3 are constants and regression coefficients and ε_{it} is the model residual, where index *i* indicates the unit of analysis or area and *t* is the unit of time.

The research model in equation (1) describes the relationship of the independent variable to the dependent variable in the short run. While the long-term relationship can be explained using the following ECM model:

$$\Delta \log PV_{it} = \beta_0 + \beta_1 \Delta \log GR_{it} + \beta_2 \Delta \log HC_{it} + \beta_3 \Delta \log PI_{it} + EC_{it} + u_{it} \quad (2)$$

Where EC_{it} is an error correction term that is calculated by the following formula:

$$ECT_{it} = \log PV_{it} - \alpha_0 - \alpha_1 \log GR_{it} - \alpha_2 \log HC_{it} - \alpha_3 \log PI_{it} \quad (3)$$

The panel data regression model in equations (1) and (2) is estimated using three approaches, namely: (a) Common Effect Model (CEM); (b) Fixed Effect Model (FEM); and (c) Random Effect Model (REM). From the three approaches to the panel data regression model, one of the best models was then selected through the model specification test.

The specification tests for the panel data regression model are: (a) the chow test; (b) the Hausman test; (c) the Lagrange Multiplier test (Widarjono, 2018).

From the results of selecting the best model through the Chow test, Hausman test, and LM test, the model assumption test was conducted. The significance of the variables employed in the mode was then assessed, either partially (t-test) or simultaneously (F-test), and the goodness of fit was evaluated using the coefficient of determination test.

Result and Discussion

The descriptive data used in this study are presented in Table 2. The observations used were 682 units consisting of 62 cross-section units and 11 time periods. Poverty in undeveloped areas is measured by the number of people living below the poverty line, whereas GRDP per capita measures economic growth, the average duration of schooling measures human capital, and direct local government spending measures public expenditures. The average number of poor people in undeveloped areas in Indonesia during the study period was 34.48 thousand people, and the highest was in Timor Tengah Selatan district, namely 144.01 in 2015.

Table 2 Descriptive Statistics

Statistics	Variable			
	PV	GR	HC	BL
Mean	34.48	22.52	5.84	459.89
Median	28.00	12.70	6.25	443.93
Maximum	144.01	394.07	10.00	1912.39
Minimum	2.52	3.15	0.25	13.16
Std. Dev.	24.84	47.43	2.05	214.09
Observations	682	682	682	682

Table 3 Stationarity Test Data

Variable	Stationer at Level			Stationer at First Difference		
	ADF Test	PP Test	LLC Test	ADF Test	PP Test	LLC Test
PV_{it}	168.59***	204.47***	-23.54***	407.78***	444.11***	-33.24***
GR_{it}	117.84	134.04	-10.52***	334.28***	355.84***	-80.72***
HC_{it}	139.06*	176.53***	-8.99***	415.43***	425.14***	-35.25***
PI_{it}	113.14	122.18	-3.86***	367.19***	417.74***	-22.15***

Note: *** significant in α 1%; ** significant in α 5%; * significant in α 10%

Furthermore, the results of the unit root test through the ADF test, the Philips Perron test, and the Levin, Lin & Chu test are presented in Table 3. The results of the unit root test show that the utilized study data is steady at the initial difference. Thus, the stationarity requirement for employing the ECM approach has been satisfied.

The estimation of the long-term panel data model based on the common effect, fixed effect, and random effects approach are shown in Table 4. Then, from the three models, the best model selection test was carried out using the Chow test, Hausman test, and LM

test, as shown in Table 5. The F-value of the Chow test is 46.95 and is statistically significant, showing that the FEM model is superior to the CEM model. The results of this test were then strengthened by a statistically significant and test value of 10.47 for the Hausman test. Therefore, the long-term panel model is a fixed-effect model.

Table 4 Long-term Panel Model Estimation

Variable	Coefficient		
	Common Effect	Fixed Effect	Random Effect
C	3.0081***	3.2806***	3.2838***
$\log GR_{it}$	-0.3854***	-0.0566	-0.0849***
$\log HC_{it}$	0.0196	-0.4639***	-0.4153**
$\log PI_{it}$	0.2088***	0.1530***	0.1514***
R^2	0,1153	0,8307	0,1142
Dependent variable: $\log(PV_{it})$			

Note: *** significant in α 1%; ** significant in α 5%; * significant in α 10%

Table 5 Long-term Panel Model Specification Test

Result	Chow Test	Hausman Test	Breusch-Pagan Test
Statistic	46.9555	10.4684	2193.7860
Prob.	0.0000	0.0150	0.0000

According to Table 6, The residual of the long-term panel model is stationary at the level determined by the ADF test and the Philips Perron test. This finding illustrates that the fixed-effects panel data regression model estimates a cointegrated connection. Consequently, the model can be estimated using an Error Correction Model (ECM) approach, where the cointegration test can only be performed on models with data that integrate to the same degree (Engle & Granger, 1987).

Table 6 Cointegration Test

Result	ADF Test	Philips Perron Test
Statistic	146.799	169.218
Prob.	0.0209	0.0006

Table 7 presents the estimation results of the ECM panel model. The estimation of the ECM panel model employs the Common Effect, Fixed Effect and Random methods. In the third approach, The ECT variable shows a negative sign and is statistically significant. These findings indicate that the ECM panel model is applicable (Engle & Granger, 1987).

Table 7 Short-term Panel Model Estimation

Variable	Coefficient		
	Common Effect	Fixed Effect	Random Effect
C	0.0073	0.0074	0.0073
$\mathrm{D}(\log GR_{it})$	-0.0125	-0.0100	-0.0125
$\mathrm{D}(\log HC_{it})$	-0.4971***	-0.4976***	-0.4971***
$\mathrm{D}(\log PI_{it})$	0.0594***	0.0564***	0.0594***
ECT(-1)	-0.2589***	-0.2378***	-0.2589***
R^2	0,2475	0,3067	0,2475
Dependent variabel: $\mathrm{D}(\log(PV_{it}))$			

Note: *** significant in α 1%; ** significant in α 5%; * significant in α 10%

The estimation results of the ECM panel model are then subjected to the Chow test, Hausman test, and LM test to determine the optimal model. The test results are shown in Table 8.

Table 8 Long-term Panel Model Specification Test

Result	Chow Test	Hausman Test	Breusch-Pagan Test
Statistic	0.8604	37.4305	1.3538
Prob.	0.7542	0.0000	0.2446

The short-term panel model specification test results show that the common effects model is better than other models according to the Chow test and LM (Breusch-Pagan) test results. Thus, the short-term panel model is estimated using the common effects model.

Based on the results of the preceding data analysis, the panel data models for the study, including both short-term and long-term models, are presented in Table 9.

Table 9 Short-Term and Long-Term Panel Models

Variable	Coefficient	
	Short-Term	Long-Term
C	0.0073	3.2806***
$\log GR_{it}$	-0.0125	-0.0566
$\log HC_{it}$	-0.4971***	-0.4639***
$\log PI_{it}$	0.0594***	0.1530***
ECT(-1)	-0.2589***	-
R^2	0.2475	0.8307

Note: *** significant in α 1%; ** significant in α 5%; * significant in α 10%

The economic growth variable used in this study has no substantial short- or long-term effect on poverty in undeveloped regions of Indonesia. This indicates that economic expansion in Indonesia's impoverished regions has not been able to reduce the number of poor people. This result contradicts the findings of prior research, which showed that economic growth lowered poverty levels in developing and underdeveloped regions of the Nile River basin (Lin et al., 2022). Even the results of research in sub-Saharan countries show that economic growth in emerging nations can reduce poverty rates rapidly (Thorbecke & Ouyang, 2022), and the results of research utilizing Indonesian data demonstrate that economic expansion reduces poverty (Adha et al., 2018). This is due to the fact that economic growth in Indonesia's undeveloped regions is relatively low, averaging 3.62 percent for the research period. Thus, efforts are needed to encourage faster economic growth in order to make economic growth an instrument for alleviating poverty in underdeveloped regions.

There are different findings on the human capital variable. Human capital significantly influences poverty rates in underdeveloped areas of Indonesia, both in the short and long term. Interestingly, this variable has a negative coefficient sign and is the most influential of all the model variables. This indicates that human capital, as proxied by the average number of years spent on schooling, significantly contributes to an attempt to reduce

poverty in underdeveloped regions in Indonesia. This finding is consistent with that of Masduki et al. (2022) and Olopade et al. (2019) in that a 10-percent increase in the average level of education can reduce the number of poor individuals by 4.5 percent. This finding shows that human capital plays a significant role in poverty alleviation efforts in Indonesia's impoverished regions.

Given the large influence of human capital in efforts to reduce poverty in these findings, local governments, especially in undeveloped regions, need to increase the number of years spent on schooling in their regions through various programs such as scholarships, public awareness of the importance of education, improving the quality of basic education and secondary education, and the development of adequate educational infrastructure to remote areas, among other programs that support education. It is hoped that this program will produce productive and high-quality human resources. Increasing the productivity of disadvantaged areas due to human capital improvements will reduce the number of poor people. Improving the quality and productivity of the poor can lead to improved output or economic growth (Anwar, 2018) and aid in poverty reduction.

In addition to human capital, public investment has a substantial short- and long-term impact on poverty levels in underdeveloped regions of Indonesia. However, the coefficient of the public investment variable is positive. This indicates that increasing public investment in Indonesia's undeveloped regions increases the number of poor people. The number of impoverished people grows by 0.59 percent in the near term and 1.53 percent in the long run for every 10 percent increase in public investment.

This result contradicts the findings of previous studies, which showed that increased public investment reduces the poverty rate in Java's undeveloped regions (Masduki et al., 2022). In other words, public investment programs in underprivileged regions outside Java have a different effect than public investment in areas on the island of Java. This could be attributed to the persistence of corruption that is still entrenched in various regions in Indonesia, especially in underprivileged areas.

Thus, to make public investment an instrument of public policy that contributes to reducing poverty levels in underdeveloped regions, each local government must be subject to rigorous monitoring. In addition, all stakeholders must be made aware of the importance of poverty alleviation so that the planned development programs can be implemented with minimal misuse and contribute to the reduction of poverty.

Conclusion

This study attempts to analyze the effect of economic growth, human capital, and public investment on poverty in Indonesia's undeveloped regions. This study employs panel data from 62 impoverished regions in Indonesia, as stipulated by Presidential Regulation number 63 of 2020, with an analysis period spanning 2010-2020. The data analysis method is employed the ECM regression model. The results of the data analysis indicate that the increase in economic growth does not considerably contribute to this study. In

the meanwhile, human capital and public investment variables have a significant influence on both the short- and long-term. This finding explains how increasing human capital might alleviate poverty in underdeveloped regions. In the meantime, public investments made by local governments have not been able to reduce poverty and have even exacerbated it in underdeveloped regions. This finding provides information that public investment made by local governments has not yet reached the desired target; therefore, it must be reassessed.

The limitation of this research is that it has not been able to offer comprehensive information regarding local government programs that have been implemented. This information must be presented to underscore the fact that development programs in impoverished countries exacerbate poverty. Consequently, it is believed that further research will reveal local government programs that are responsible for the increase in poverty. This information will assist local governments in targeting development programs that increase the number of poor people to cease and continue development programs that can reduce the number of poor people in underdeveloped regions.

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